Role of Technology in Achieving Sustainability in Interior and Fashion Design Disciplines

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Abstract

Science and technology have both good and bad impact on the environment. It is the human choice whether to use technology for destruction or for restoration of nature. Restoring the environment for the upcoming future generations is being sustainable. Technology plays a vital role in achieving sustainability socially, economically as well as culturally. Today traditional designing, manufacturing and construction process consumes a lot of time and energy. These manufacturing and construction processes can be made time saving and sustainable by incorporating technology in the right manner. This research is done on the pros of using technology in Fashion and Interior design disciplines. Fashion Design means enhancing the personality of an individual by designing his/her clothing, garments and accessories. Whereas, Interior Design means enhancing any built-up space by designing the building envelope, it's furniture and other accessories within the enclosure. These two creative fields can be made techno-friendly and at the same time sustainable by using CAD & CAM which can reduce the time span of designing, production as well as marketing. The research talks about such design technologies, their advantages and their constrains, their awareness amongst designers and how their use can be increased in the design field to achieve sustainability.

Key words : *Sustainability, Fashion Design, Interior Design, building envelope, Garment, AI (Artificial Intelligence), VR (Virtual Reality), CAD (Computer Aided Design), CAM (Computer Aided Manufacturing), 3D Modeling.*

Introduction

Technology these days is being used in each and every part of the society. It is the most important tool to progress. Technology if used in the right manner can prove to be helpful in saving the environment whereas if treated in a haphazard way can lead to devastating destructions. Different streams, different disciplines have come up with a wide range and variety of technologies that are a boon to the societal upliftment. The two most creative disciplines that are fashion design and interior design too fall into the same category. These disciplines have a wide range of technologies which help in improved and fast designing, production and marketing. These technologies save time of the whole designing and production cycle. Saving time and efforts in turn becomes fruitful in achieving sustainability to a great extent. This research focuses on the role technology plays in attaining sustainability in the design fields.

Technology

There are numerous technologies available in the market related to designing, manufacturing and marketing. For interior design as well as fashion design technology can be applied at each and every stage. It all begins with design conceptualization, then conveying the design concept to the client, then comes the drawing part, and then the construction and finally marketing. Use of technology is inevitable in all these stages of designing, manufacturing and marketing. Technology can be in form of software, electronic gadgets, VR, AI or can be even machineries.

Sustainability

There is not a set definition of sustainability. Sustainability means to be sustainable. It roughly implies that whatever is the present condition, to maintain the same. That means to maintain the same environmental, social, economical and cultural conditions for the future generations. For retaining a healthy, diverse, thriving and resilient society conservation is required in all the fields. Sustainability works on the concept that all the resources available to mankind are in a finite ratio and so these resources should be consumed wisely keeping in mind the need of mankind and not the want. Thus, sustainability can be summed up as avoiding the depletion of resources to maintain an ecological balance by not compromising the life quality of the current society.

Fashion Design

It is an innovative discipline that deals with creating clothing and life style accessories. These clothing can be either customized or ready to wear. The clothing design of an individual depends on his/her cultural, social and economical background; age, gender, prevailing fashion trends and also on the climate. This is a very creative field where the fashion designer has to be good at visually imagining things and then putting that on to paper in the form of sketches. Designers have to have good sense of color combinations and also a thorough knowledge of fabric and its fitment. Fashion design curriculum also develops stitching skills and the detailed knowhow of different fabrics. Since today's world is fast moving towards technology, the fashion designers also need to be technically sound to cope up with the market competition.

Interior Design

It is a field closely associated with architecture. Interior design is a part of environmental design where interiors of manmade structures are designed as per the client's requirements. An interior designer has to be technically sound and same as a fashion designer has to possess sketching skills and a good perception of color combination. An interior designer should be well aware of the building codes, building and furnishing materials, space planning, lighting, plumbing, designing and drafting software. Interior design of a built-up space depends on the client's preferences, age, profession, and budget; climatic conditions of the site and the current market trends.

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in Interior and Fashion Design

Technology does play a vital role in achieving sustainability and it's up to the designers that up to what extent they can explore these technologies in their respective fields of expertise. Technology is used in each and every domain of designing, manufacturing, advertising and transporting the products. A few areas where technology can be prominently used to gain sustainability are enlisted below.

A Time Saving- Designing and drawing can be done with the help of software which in turn saves a lot of time and energy. Turning one's ideas into 2D and 3D realistic models can become fast and easy. These drawings can be made realistic using color rendering and light effects with the help of design software. Drawing errors can be easily rectified if software is being used. Commuting time is also saved as instead of meeting the client face to face, the designer can opt for virtual media meet.

B Paperless Work - With the prevailing technologies there is no need of hand drafted designs. Designers choose software for putting forward their design concepts to the clients or the manufacturer. Also with the help of different applications there is no need of maintaining dairies for appointments, this too can be done with the help of technology. Going paperless means conserving trees.

C Less Storage Space - Since the drawings are in soft copies there is no need to store the sheets and other drawing materials. More quantity of visual images can be stored for future use. This saves the paper consumption and more space is not required to store the stationary materials and fabric samples.

D Easy and Fast Search - With the help of AI and other media available the designer has a vast and tremendous resource to explore and search for new design ideas and the upcoming fashion trends.

E Easy Transfer of Ideas - Using Virtual Reality platform the designers can convey the client or the vendor the exact design theme what they have conceived. Also, software generated 3D modeling, walk through can prove to be helpful in convincing the client regarding the project design.

F Accuracy - Drawing errors can be corrected easily if the work is done on software. Making multiple copies of a proposed design with the exact same dimensions is possible with the help of software. Products as well as designs can be standardized and their quality can be maintained with the use of software.

G Cost Effective - Since the drawing and designing is done by adopting software the labor cost is saved. Skilled draftsmen are not required. Commuting to the site is no more needed and this cost is also saved. Market surveys in search of materials and trending fashion is not required as it is easily available on websites, so this cost is also saved.

H Fast and Increased Production - 3D printers are coming up in the market and they lead to fast production of the designed article. Also, higher end machines with latest technology are available in the market that reduces the manufacturing time. Standardized articles with high accuracy can be manufactured in a large number with the help of such machineries.

I Building Professional Network - Through software, social media websites and applications the designer can get in touch with other fellow national as well as international designers, vendors and manufacturers and can increase their knowledge spectrum and broaden up their marketing and working circle.

Thus, it is clearly understood that whether to save time or to increase the production, or to maintain the quality norms, technology is helpful in every domain of the design supply chain system. These points also lead to sustainability as the designing and manufacturing process becomes fast and paperless. Commuting can be eliminated to a great extent if technology is used, thus saving fuel. So, by the above-mentioned points it is seen that technology proves to play a key role in achieving sustainability.

Literature Review

Zhen Zhang and Jianwei Ban(2022) "Aesthetic Evaluation of Interior Design Based on Visual Features". The study states that interior designing these days has become a vital part of the society. Interior modeling, furnishings and decorations indicate a better life style of mankind. These various styles of interior design depend on technology and science. The style of interiors reflects the cultural ethos of a country. The emergence of digital devices has lead to a variety of digital images. The fast growth of AI has opened a new level of aesthetics and interior designing is becoming automatic. This paper emphasizes on how AI and other technologies help the interior designer in choosing the right and effective interior design from the set of collected images and digital devices.

Tushar Govind Soliwal(2021)"Role of Software and Technology in Fashion Designing"

The study says that software and technology play a very important role in fashion designing. Textile and other manufacturing industries related to fashion design also use different technologies for speed and increase of production. These technologies reduce time, and decreases the labor cost. Designers and engineers use Artificial Intelligence and other designing software to increase productivity, improve quality and efficiency and also to maintain the standards. Customer satisfaction also increases with the use of technology. Lastly the study states that since fashion design is one of the largest industries, preference of the use of technologies and AI can help in gaining full potential in the complete supply chain system.

Rob Marjerison, Kiara Carranza Gudiel and Yuxi Zhao(2021) "Scope for Sustainability in the Fashion Industry Supply Chain: Technology and Its Impact".

This study tries to determine that whether the entrepreneurial innovations in technology can bridge between the two contradicting short-term fashion and long-term fashion design industry to attain social, environmental and economical sustainability. The present fashion industry is driven by the changing trends and so is not much sustainable. The research says that the fact that emerging technologies can lead to sustainable tomorrow is very uncertain. The research

gives the findings that technologies can lead to sustainability only if they are used in each and every stage of designing, production and thus the complete supply chain system.

Leng Yi(2021) "Revolutionizing Space: Fusion of Artificial Intelligence (AI) Technology Towards Sustainability".

This paper reveals the fact that after COVID-19 the tourism industry of Malaysia faced a major setback specially the hotels were forced to shut down because of lack of revenue generation. At the same time the UN wants all nations to implement the sustainable goals for a better future. And so this research concentrates on the implementation of AI in building interiors that focuses on energy efficiency. The research gives suggestions on what types of AI are useful for the built-up space, what are the advantages of using AI and also what how AI should be mechanized to attain energy efficient interiors.

Zixuan Chen and Xiang Wang(2020): "Application of AI technology in interior design"

AI technology is the emerging technology of the recent years and it is changing the way interior designing is being done. This research starts with the combination of AI and interior design and gives a multi angle vision of the future. This can give solution to problems related to bedroom, kitchen, storage and play area designs. Storing drawings is a major issue for the designers which can be easily solved with the use of AI. This research revolves around this concept.

Z Kazlacheva, V Stoykova, K Georgieva and J Ilieva (2018) "Application of innovative technologies in fashion design education"

The study says that application of the educational and design related technologies provide better education through its quality of being flexible, interactive and dynamic. The study lays emphasis on the educational technologies of fashion design at Bachelor's and Master's level in the Technics and Technologies department of Trakia University, Bulgaria. These innovative educational technologies provide easy and more access to a vast study material, that gives more knowledge in a shorter time span developing the creative skills of students which in turn leads to improvement in the quality of education.

Research Methodology

For this research study both primary as well as secondary data were collected and studied. For primary data a set of ten questions were designed and were asked to 30 interior designers and 30 fashion designers practicing in the market. These questions were circulated amongst the practitioners via Google forms and then their feedback was recorded. Based on this feedback the primary data analysis is being done. Their feedback has been compiled in this research paper. As for the secondary data, previously done researches on the role of technology in fashion and interior design as well as the methods of attaining sustainability in both these fields have been studied and noted down in the literature review section.

Result and Discussion

To figure out the level of understanding of the practicing Interior and Fashion designers have for technology and what impact it has in gaining technology a survey was carried out. For this survey a set of ten questions were asked to thirty Interior Designers and thirty Fashion Designers each. These questions were based on their awareness and use of technology in design discipline to attain sustainability. The responses received from the designers are noted down in the table1.1 given below.

Sr. No.	Question	Feedback
1.	Awareness regarding sustainability in the design fields	The following responses were obtained from designers regarding their awareness of sustainability in design. • 50% - Yes, they are aware • 8%- No, they are not aware

		• 42%- Not completely aware of sustainability can be achieved in design field
2.	Belief that sustainability is important for a healthier future	The below listed feedback was given by the designers regarding the importance of a healthier future • 98% - Yes, it is important • 0%- No, it is not important • 2%- Not sure what does it exactly mean.
3.	Awareness regarding technologies used in the design field	Following percentage of designers were aware of the technologies. • 87%- Were aware of the technologies related to design discipline • 13%- Were not completely aware of the technologies used in design field.
4.	Belief that technology can help to attain sustainability	The below feedback was obtained for their belief • 92% - Yes, they believed that sustainability can be gained with the help of technology • 8%- Were not sure that how sustainability be achieved with the help of technology.
5.	Ways in which technology can help attain sustainability	The following ideas were shared by the designers • Paperless work • Fuel saving as transportation decreases • Time and energy saving • Fast production in bulk • Maintaining quality standards
6.	Technology up gradation through which medium	Designers came up with these answers on how they come to know of the prevailing technology • Through peer group • Through social media • Through company campaigns • Design magazines and handouts • Design exhibitions, shows and expos
7.	Areas of the supply chain system of design that can attain sustainability through technology	Designers responded in the below given ways • Designing can be done using software like CAD • Drafting software can be used • 3D printers can be used for fast production • VR can be used for visualization of the design concept • AI can be used at different stages
8.	Importance of sustainable construction in the design field	The following feedback was obtained on whether there should be sustainable construction process in design • 99% - Yes, design construction should take place in a sustainable manner • 1%- Were not sure that how design construction can be done in a sustainable way.
9.	Challenges faced in opting technology in the design field	The designers said that they faced the following problems in choosing technology for their design projects • Frequent up gradation • Skilled draftsmen are not easily available • Uninterrupted electricity and internet facilities are not always at hand. • Apt disposal of E-waste many a times is unmanageable • Keeping in pace with the latest technologies is

		very strenuous
10.	Suggestions to use technology for sustainable future	Designers gave the underneath suggestions for using technology as a tool to attain sustainability in design. • Prefer VR so that E-waste of hard drives and pen drives can be reduced. • Reduce multiple copy storage of designs, reduce the junk • Don't redo the same drafting on soft as well as hard copy • User friendly technology with less clutter and which is easy to operate should be developed • Network towers should be installed in rural and suburban areas

Table 1.1

The above table talks about the discussion done with the experts and their feedback related to the same. It is clear that designers are using technology in designing, manufacturing and marketing and this in turn is proving to be sustainable too. But technology does have its own limitations. A few such problems were highlighted by the fashion and interior designers that they face while implementing technology in their work routine that are stated below.

Lack of Skilled Labor – Skilled labor and drafts persons are required to use technology and run design and drafting software and operate machines. These labors are not easily available or approachable, specifically this implies to the rural areas. Deficiency of skilled labor leads to improper use of technology that can prove dangerous for the design and manufacturing processes.

Lack of Technical Knowledge - Old school designers face problem in adapting the latest technologies. Also, many designers till date are not aware of the upcoming technologies trending in the market. This brings a setback in the design process. Regular trainings need to be organized to overcome this problem.

Expensive - Possessing all the recent technological gadgets, machines and software is not easy and pocket friendly. The latest technologies can fall out to be very costly. Also, these technologies require electricity, batteries and uninterrupted internet connection. All these collectively increases the basic cost of the technology used.

Up gradation and Maintenance - Science progress on a daily basis so is the design technology. The designers have to be updated with the recent existing technology; software available in the design business. And so, they have to opt for the latest technologies for their work places. Also, these technological higher end machines and gadgets need to undergo a time-to-time maintenance which again requires time and energy and increase the basic cost of that technology used.

Poor availability of network in rural areas - A majority of these technologies require internet connection for their proper functioning. Uninterrupted high speed internet connection is very difficult to obtain in the rural areas and industrial areas which are usually located in the outskirts of any city.

E-Waste Disposal - Technology uses machines and electronic gadgets. These machines and gadgets and even their spare parts have a limited life span, also they need to be up graded every now and then. Proper disposal of this E-waste is very difficult and cumbersome. This waste if not disposed properly becomes a threat to the environment.

As per the fashion and interior designers; under developing countries face these limitations to a greater extent. The role of technology in attaining sustainability and also its limitations prove to be beneficial only if the designers are aware of them. If ways and means to overcome these limitations are looked for then a sustainable future can be attained easily and at a faster rate.

Conclusion

Technology has its own constrains like it is costly, needs timely maintenance and up gradation, also requires constant electricity supply with high-speed internet connection and needs appropriate ways to dispose its E-waste. If these limitations are conquered then technology proves to be a boon for the design fraternity. Technology can make work go paperless thus saving the trees and ultimately saving the environment. Putting VR and AI into day-to-day work practice can reduce the required storage space and need for commuting, increase production with less time and energy consumption and also can reduce the requirement of man power. Mistakes can be easily rectified if drawing software is used. Also, with the help of VR the design concepts can be effortlessly explained to the clients and vendors and they can have a complete look of the designed product or project even before the commencement of the actual field work. These technologies help in saving time and effort and also fuel thus aid in gaining sustainable future. VR also assist in reducing the bulk rejection of designed products, this lessens the dumping waste of product, thus saving the environment. It can be summed up as technology is a multi-faceted tool for design development and manufacturing and if utilized wisely can lead to develop a sustainable future for the coming young generations.

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